

Appendix E

National Type Evaluation Technical Committee Measuring Sector September 24-25, 1999 Olympia, Washington Meeting Summary

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1. Update to NCWM Publication 14 to Reflect Changes to NIST Handbook 44

Background: In July 1999, the 84th National Conference on Weights and Measures (NCWM) adopted the following items that will be reflected in the 2000 edition of NIST Handbook 44 and NCWM Publication 14. These items are part of the agenda to inform the Measuring Sector of changes that immediately affect the National Type Evaluation Program (NTEP) policy and procedures.

A) G.S.1. Identification; Serial Number

Handbook 44 Changes:

G-S.1. Identification. – All equipment, except weights and separate parts necessary to the measurement process but not having any metrological effect, shall be clearly and permanently marked for the purposes of identification with the following information:

(a) the name, initials, or trademark of the manufacturer or distributor;

(b) a model designation that positively identifies the pattern or design of the device;

(c) *except for equipment with no moving or electronic component parts, a non-repetitive serial number; and*
[Nonretroactive as of January 1, 1968]

(d) *the serial number shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required serial number, and;*
Nonretroactive as of January 1, 1986]

(e) the serial number shall be prefaced by the words “Serial Number” or an abbreviation of that term. Abbreviations for the word “Serial” shall, as a minimum, begin with the letter “S,” and abbreviations for the word “Number” shall, as a minimum, begin with the letter “N” (e.g., S/N, SN, Ser. No, and S No.).
[Nonretroactive as of January 1, 2001]

The required information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.
(Amended 1985, 1991, and 1999)

Corresponding Changes to Publication 14:

Modify Liquid-Measuring Devices Checklist paragraph 1.1.3 as follows:

1.1.3. ~~The serial number must be prefaced with words or an abbreviation that clearly identifies it as the serial number.~~ The serial number shall be prefaced by the words “Serial Number” or an abbreviation of that term. Abbreviations for the word “Serial” shall, as a minimum, begin with the letter “S,” and abbreviations for the word “Number” shall, as a minimum, begin with the letter “N” (e.g., S/N, SN, Ser. No, and S No.).

Modify Electronic Cash Registers Interfaced with Retail Motor-Fuel Dispensers Checklist paragraph 1.4 as follows:

1.4 The serial number shall be prefaced by words, an abbreviation, or a symbol that clearly identifies the number as the serial number. The serial number shall be prefaced by the words “Serial Number” or an abbreviation of that term. Abbreviations for the word “Serial” shall, as a minimum, begin with the letter “S,” and abbreviations for the word “Number” shall, as a minimum, begin with the letter “N” (e.g., S/N, SN, Ser. No, and S No.).

Discussion: The technical advisor reviewed the changes the made to Handbook 44 paragraph G-S.1. at the 1999 Annual Meeting of the NCWM. There were no comments from the Sector. The Sector agreed to modify the 2000 edition of Publication 14 as noted above to reflect changes made to paragraph G-S.1.

B) Table S.2.2. Categories of Device and Methods of Sealing

Handbook 44 Changes: At its 1999 Annual Meeting, the NCWM voted to amend Table S.2.2. of the Liquid-Measuring Devices Code as follows to clarify the application of Category 2 and Category 3 requirements:

<i>Table S.2.2. Categories of Device and Methods of Sealing</i>	
<i>Categories of Device</i>	<i>Method of Sealing</i>
<i>Category 1: No remote configuration capability.</i>	<i>Seal by physical seal or two event counters: one for calibration parameters and one for configuration parameters.</i>
<p><i>Category 2: Remote configuration capability, but access is controlled by physical hardware.</i></p> <p><i>Device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode.</i></p> <p><i>[Category 2 applies only to devices manufactured prior to January 1, 2005. Devices with remote configuration capability manufactured after that date must meet the sealing requirements outlined in Category 3. Devices without remote configuration capability manufactured after that date will be required to meet the minimum criteria outlined in Category 1.]</i></p> <p><i>[Nonretroactive as of January 1, 2005]</i></p>	<p><i>[The hardware enabling access for remote communication must be on-site. The hardware must be sealed using a physical seal or an event counter for calibration parameters and an event counter for configuration parameters. The event counters may be located either at the individual measuring device or at the system controller; however, an adequate number of counters must be provided to monitor the calibration and configuration parameters of the individual devices at a location. If the counters are located in the system controller rather than at the individual device, means must be provided to generate a hard copy of the information through an on-site device.]*</i></p> <p><i>[*Nonretroactive as of January 1, 1996]</i></p>
<p><i>Category 3: Remote configuration capability access may be unlimited or controlled through a software switch (e.g., password).</i></p> <p><i><u>The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode.</u></i></p> <p><i><u>[Nonretroactive as of January 1, 2001]</u></i></p> <p><i>Category 3 will be modified in 2005 to apply to</i> Nonretroactive as of January 1, 2005 all devices with remote configuration capability must comply with the sealing requirements of Category 3.</p>	<p><i>An event logger is required in the device; it must include an event counter (000 to 999), the parameter ID, the date and time of the change, and the new value of the parameter. A printed copy of the information must be available through the device or through another on-site device. The event logger shall have a capacity to retain records equal to ten times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)</i></p>

[Nonretroactive and enforceable as of January 1, 1995.]
(Table added 1993) (Amended 1995, and 1998, and 1999)

The Sector should note that similar changes were adopted to Table S.3.5. Categories of Device and Methods of Sealing in the Mass Flow Meters Code because both technologies are used in comparable applications and, therefore, are held to similar requirements.

Corresponding Changes to Publication 14:

Amend the sealing requirements of Category 3 Devices in Section 2.16 Graduations, Indications, and Recorded Representations of the Liquid-Measuring Devices Checklist as follows:

Category 3 Devices (Unlimited Remote Configuration Capability)

All devices with remote communication that are manufactured after January 1, 1999 must meet the requirements outlined for Category 3. Access to change the configuration and calibration parameters may be unlimited, or controlled through a password, if the device meets the requirements for Category 3.

- The device clearly indicates when it is in the remote configuration mode or does not operate while in this mode if manufactured after January 1, 2001 ☐ Yes ☐ No ☐ NA
- The device is equipped with an event logger. ☐ Yes ☐ No ☐ NA
- The event logger automatically retains the identification of the parameter changed, the date and time of the change, and the new value of the parameter. ☐ Yes ☐ No ☐ NA

Amend Section 2. of the General Requirements for Metrological Audit Trails in Appendix A Minimum Requirements for Audit Trails for Category 2 Devices of the Liquid-Measuring Devices Checklist as follows:

For Category 2 and Category 3 devices: When a remotely configurable device is in the remote configuration mode, that is, capable of receiving changes to sealable parameters, the device shall either:

- a. not indicate or record (if equipped with a printer) ; or
- b. provide a clear and continuous indication that it is in remote configuration mode. Any printed ticket or receipt shall include a message with each ticket or receipt that the device is in the calibration mode.

The modified criteria shown above will appear in the next edition of Publication 14.

[Editorial Note: As per the dates specified in Table S.2.2., all references to Category 2 will be removed from the Liquid-Measuring Devices Checklist in Publication 14 as of 2005.]

Discussion: The Sector discussed ways to establish criteria that clearly reflect the intent of NCWM changes to Handbook 44. The Sector considered including in Publication 14 specific methods for devices to indicate when they are in the remote configuration mode. Several Sector members were concerned that if Publication 14 criteria are too vague the laboratories might incorrectly require devices other than the primary indicating device to indicate when the system is in the remote configuration mode. The Sector agreed that this requirement was added to Handbook 44 to alert the device users when the device is in the remote configuration mode. Consequently, the Sector thought that in many applications it should not be necessary for backroom controllers to indicate when a device is in the remote configuration mode. Furthermore, devices should not enter the remote configuration mode during a transaction because this facilitates fraud.

Conclusion: The Sector agreed that the proposed language shown above adequately summarizes the latest audit trail requirements. The Sector also notes that the requirements apply to all primary indicating devices, which includes dumb indicators, that is indicators with no intelligence.

C) T.2.1.X. Tolerances for Devices Delivering Less than One Gallon

The following changes to Handbook 44 are provided for the Sector's information and to alert the NTEP Laboratories and manufacturers of changes to the tolerances. Tolerances are not generally listed in the Publication 14 Checklists; therefore, no changes to Publication 14 are necessary.

Handbook 44 Changes:

At its 1999 Annual Meeting, the NCWM adopted the following new paragraph T.2.1.4. Tolerances for Devices Designed to Primarily Deliver Less than One Gallon to the Liquid-Measuring Devices Code in Handbook 44:

T.2.1.4. Tolerances for Devices Designed to Primarily Deliver Less than One Gallon. - Maintenance tolerances and acceptance tolerances shall be as shown in Table 2. Tolerances for Slow-Flow Meters.

Discussion: The Sector reviewed the new tolerances for devices designed to primarily deliver less than one gallon of product. The Sector did not comment on the new tolerances.

D) Measurement of Asphalt

The following changes to Handbook 44 are provided for the Sector's information and to alert the NTEP Laboratories and manufacturers of changes to the tolerances. Tolerances are not generally listed in the Publication 14 Checklists; therefore, no changes to Publication 14 are necessary.

Handbook 44 Changes:

At its 1999 Annual Meeting, the NCWM adopted the following new paragraph T.2.3.2. Measurement of Asphalt to Section 3.30 of the Liquid-Measuring Devices Code and renumbered existing paragraphs T.2.3.2. through T.2.3.4. accordingly.

T.2.3.2. Measurement of Asphalt. – Maintenance tolerances and acceptance tolerances shall be:

	<u>Acceptance</u>	<u>Maintenance</u>
<u>Asphalt below 50 °C</u>	<u>0.2 %</u>	<u>0.3 %</u>
<u>Asphalt above 50 °C</u>	<u>0.3 %</u>	<u>0.3 %</u>

Discussion: The Sector reviewed the new tolerances for meters used to measure asphalt. The Sector did not comment on the newly adopted tolerances.

E) S.3.3. Vapor Elimination, Accuracy Classes for Mass Flow Meter Applications, and Testing Procedures

The following changes to Handbook 44 are provided for the Sector's information and to alert the NTEP Laboratories and manufacturers of changes to the tolerances. Tolerances are not generally listed in the Publication 14 Checklists; therefore, no changes to Publication 14 are necessary.

[Editorial Note: A note similar to that found under the Field Evaluations and Permanence Tests for Vehicle Tank Meters will be added to the corresponding Publication 14 Section for Mass Flow Meters to reflect the new paragraph N.]

Handbook 44 Changes: At its 1999 Annual Meeting, the NCWM adopted modifications to paragraph S.3.3.Vapor Elimination and Table T.2. Accuracy Classes for Mass Flow Meter Applications, and added a new paragraph N.6. Testing Procedures to the Mass Flow Meters Code as follows. (Note: Changes shown in Table T.2. below also include changes described in Sector Agenda Item I(F))

S.3.3. Vapor Elimination. - A liquid-measuring instrument or measuring system shall be equipped with an effective vapor or air eliminator ~~gas extractor~~ or other effective means, automatic in operation, to prevent the measurement of vapor and air ~~that result in errors greater than the tolerance for the minimum measured quantity (see N.1.).~~ Vent lines from the air or vapor eliminator shall be made of metal tubing or some other suitable rigid material.

Table T.2. Accuracy Classes for Mass Flow Meter Applications				
Accuracy Class	Application or Commodity Being Measured	Acceptance Tolerance	Maintenance Tolerance	Special Test Tolerance
0.3	Loading rack meters, vehicle-tank meters, home heating oil, <u>heated products (except asphalt above 50 °C)</u> asphalt below 50 °C, milk and other food products, large capacity motor-fuel dispensers (maximum discharge flow rates greater than 100 L or 25 gallon per minute), all other liquid applications not shown in the table where the minimum delivery is at least 700 kg (1500 lb)	0.2%	0.3%	<u>0.5 %</u>
0.3A	<u>Asphalt above 50 °C</u>	<u>0.3 %</u>	<u>0.3 %</u>	<u>0.5 %</u>
0.5	Small capacity (retail) motor-fuel dispensers, agri-chemical liquids, all other liquid applications not shown in the table	0.3%	0.5%	<u>0.5 %</u>
1.0	Anhydrous ammonia, LP Gas (including vehicle tank meters)	0.6 %	1.0 %	<u>1.0 %</u>
2.0	Compressed natural gas as a motor fuel	1.5%	2.0%	<u>2.0 %</u>
2.5	Cryogenic liquid meters, liquefied compressed gases other than LP Gas	1.5%	2.5%	<u>2.5 %</u>

N.6. Testing Procedures.

N.6.1. Normal Tests. - The normal test of a meter shall be made at the maximum discharge rate developed by the installation. Any additional tests conducted at flow rates down to and including the rated minimum discharge flow rate shall be considered normal tests.

N.6.2. Special Tests. - Special tests to develop the operating characteristics of a meter and any special elements and accessories attached to or associated with the device, shall be made as circumstances require. Any test except as set forth in N.6.1. shall be considered a special test. Special test of a measuring system shall be made to develop operating characteristics of the measuring systems during a split compartment delivery. (See Table T.2.)

Corresponding Changes to Publication 14:

Add new paragraphs 37.1 and 37.2 Vapor Elimination as follows and renumber existing paragraphs 37.1 through 37.11:

37. Measuring Element

Code Reference: S.3.3. Vapor Elimination

37.1 A mass flow metering system shall be equipped with a vapor or air eliminator or other automatic means to prevent the passage of vapor and air through the meter.

37.2 Vent lines from the air or vapor eliminator (if present) shall be made of metal tubing or other rigid material to prevent the lines from being pinched closed and re-opened without being detected.

Add a note to Section M. Permanence Tests for Mass Flow Meters to reflect new Handbook 44 paragraph N.6. Testing Procedures.

Note: The normal test of a mass flow metering system shall be made at the maximum discharge rate developed under the conditions of the installation. Any additional tests conducted at flow rates down to and

including one-half of the sum of the maximum discharge flow rate and the rated minimum discharge flow rate shall be considered normal test. (Code reference N.6.)

Discussion: The Sector reviewed the modifications to Handbook 44 Mass Flow Meters Code paragraph S.3.3. Vapor Elimination, Table T.2. Accuracy Classes for Mass Flow Meter Applications, and N.6. Testing Procedures, and other application tolerances. The Sector did not comment on the newly adopted applications and corresponding tolerances.

F) Heated Products Metered with Mass Flow Meters

The following changes to Handbook 44 are provided for the Sector's information and to alert the NTEP Laboratories and manufacturers of changes to the tolerances. Tolerances are not generally listed in the Publication 14 Checklists; therefore, no changes to Publication 14 are necessary.

Handbook 44 Changes: At its 1999 Annual Meeting, the NCMW adopted the following changes to paragraphs T.1 and T.2 and to Table T.2. to recognize mass flow meter applications dispensing heated products (Note: Changes shown in Table T.2. below also include changes described in Sector Agenda Item 1(E))

T.1. Tolerances, General.

- (a) The tolerances apply equally to errors of underregistration and errors of overregistration.
- (b) The tolerances apply to all products at all temperatures **between 10 °C to 50 °C, inclusive**, measured at any flow rate within the rated measuring range of the meter.

**T.2. Tolerances. - The tolerances for mass flow meters for specific liquids, gases, and applications are listed in Table T.2.
(Amended 1994 and 1999)**

Table T.2. Accuracy Classes for Mass Flow Meter Applications				
Accuracy Class	Application or Commodity Being Measured	Acceptance Tolerance	Maintenance Tolerance	Special Test Tolerance
0.3	Loading rack meters, vehicle-tank meters, home heating oil, <u>heated products (except asphalt above 50 °C) asphalt below 50 °C</u> , milk and other food products, large capacity motor-fuel dispensers (maximum discharge flow rates greater than 100 L or 25 gallon per minute), all other liquid applications not shown in the table where the minimum delivery is at least 700 kg (1500 lb)	0.2%	0.3%	<u>0.5 %</u>
<u>0.3A</u>	<u>Asphalt above 50 °C</u>	<u>0.3 %</u>	<u>0.3 %</u>	<u>0.5 %</u>
0.5	Small capacity (retail) motor-fuel dispensers, agri-chemical liquids, all other liquid applications not shown in the table	0.3%	0.5%	<u>0.5 %</u>
1.0	Anhydrous ammonia, LP Gas (including vehicle tank meters)	0.6 %	1.0 %	<u>1.0 %</u>
2.0	Compressed natural gas as a motor fuel	1.5%	2.0%	<u>2.0 %</u>
2.5	Cryogenic liquid meters, liquefied compressed gases other than LP Gas	1.5%	2.5%	<u>2.5 %</u>

Discussion: The Sector reviewed the new tolerances for mass flow meters used to measure asphalt and other heated products. The Sector did not comment on the newly adopted tolerances.

2. Identification of Model Number

Source: NCWM Specifications and Tolerances (S&T) Committee

Background: At the 1999 NCWM Annual Meeting, the S&T Committee considered amending G-S.1. (b) to include the word “model” to clearly identify the model designation on a device. Based on industry comments, the S&T Committee acknowledged that there are many terms used internationally, such as “type,” “pattern,” “design,” and “style,” to denote “model.” These alternate terms are also often used in conjunction with the term “number.” The NCWM S&T Committee recognized that, if no change was made to the current wording in Handbook 44, some manufacturers will not label the model number with a prefix that positively identifies it as the model number. If the model number is not clearly identified, it is difficult for weights and measures field officials and NTEP laboratory staff to locate the model number on the device and subsequently the corresponding NTEP Certificate of Conformance. The S&T Committee asked the NTETC Sectors and the NTEP Participating Laboratories to review the alternate terms to determine if the proposed modifications to paragraph G-S.1. are acceptable to both weight and measures officials and industry representatives.

The Sector reviewed the following proposal to modify Handbook 44 paragraph G-S.1.(b) to require a term that positively identifies the device model number to read as follows:

G-S.1. (b) a model designation that positively identifies the pattern or design of the device; and is prefaced by the term “model.”
[Nonretroactive January 1, 200X]

Discussion: The Sector agreed that current G-S.1. (b) wording is very vague and lends itself to a broad interpretation of what markings positively identify the model number on a device. One Sector member noted that, while G-S.1. (b) currently requires that the manufacturer list the model number somewhere on the device, it does not require that the model number be printed on the identification plate. The Sector considered the feasibility of requiring the model number to be prefaced by words such as “model,” “type,” “pattern,” “style,” and “series” on the identification plate. The Sector decided that only “pattern” and “model” are appropriate terminology to identify the unique model number. Some Sector members believed that printing the Certificate of Conformance Number on the identification badge would eliminate many of the problems that weights and measures inspectors experience when the model number is not adequately identified. However, several manufacturers responded that it would be impractical for them to print the certificate number on their devices.

Conclusion: The Sector recommends that the NCWM S&T Committee consider modifying G-S.1. (b) as follows:

G-S.1. (b) a model designation that positively identifies the pattern or design of the device; and is prefaced by the term “model” or “pattern.”
[Nonretroactive January 1, 200X]

The Sector recommends that this requirement be non-retroactive to provide enough time for manufacturers to modify their identification badges.

3. Duplicate Receipts

Source: NCWM Specifications and Tolerances Committee

Background: The NCWM adopted a requirement to identify duplicate receipts generated by taximeters based on concerns that duplicate receipts could be used fraudulently. In 1999, the NCWM also considered the Specifications and Tolerances (S&T) Committee proposal to add a new paragraph to the Handbook 44 General Code to require that all duplicate receipts be clearly labeled with the words “duplicate” or “copy.”

During the 1999 NCWM Annual Meeting, a retail motor-fuel dispenser manufacturer indicated that Publication 14 already addresses duplicate receipts printed by retail motor-fuel dispensing systems. Following that meeting, the S&T Committee asked for input on whether the proposed requirement should apply to all device types (and, thus, be included

in the General Code) or should apply only to specific device types such as taximeters (and thus, be included only in specific device codes). The S&T Committee also agreed that it might be appropriate to develop design requirements, in addition to General Code paragraph G-S.2. Facilitation of Fraud, as a basis for Publication 14 criteria which prohibit fraudulent use of duplicate receipts.

The S&T Committee noted that the latest generation of electronics already enable liquid-measuring device ticket printers to generate duplicate receipts such as those seen on the vehicle tank metering systems; therefore, the Committee agreed that it is important to establish requirements as quickly as possible to address such features. The S&T Committee noted that it might be inappropriate to require the same requirements for printed and handwritten receipts. Some NCWM members questioned the capability of mechanical and non-intelligent printers to provide duplicate receipt information. The S&T Committee asked the regional associations for input about problems officials encounter when systems have the capability to issue duplicate receipts.

The Sector reviewed the following proposal to add new paragraph G-S.5.6.2. Duplicate Receipts to Handbook 44 General Code which is being considered by the S&T Committee:

G-S.5.6.2. Duplicate Receipts. - A recording element may produce a duplicate receipt for the previous transaction provided the information printed is identical to the original with the exception of time issued. The duplicate receipt must include the words "duplicate" or "copy."
[Nonretroactive as of January 1, 200X]

Discussion: The Sector considered several examples of situations where it is appropriate to issue a "duplicate" receipt such as a ticket unretrievably jammed into the device or a power outage. The Sector concluded that if a receipt is printed at a retail motor-fuel dispenser and at the console, both receipts might be considered the original receipts. Several Sector members favored printing a sequential transaction number on the receipt which would be the same on all of the receipts; however, one regulatory official was concerned about enforcing a requirement for sequential numbering of receipts. The Sector did not believe that this prevents fraud because the customer would not understand the significance of the transaction number.

Conclusion: The Sector recommends that the NCWM S&T Committee consider adding specific requirements to each of the appropriate code sections in Handbook 44 to address duplicate receipts rather than adding a requirement to the General Code. The Sector had no recommendations for additions to specific device codes.

4. Width of Index and Graduations

Source: 1998 NTETC Measuring Sector Meeting

Background: At the 1998 Sector meeting, the Sector recommended amending paragraph S.1.5.3.(a) Width; Indicator Index of the Liquid-Measuring Devices Code to read as follows:

S.1.5.3. Width.

(a) The index of an indicator shall not be wider than the width of the widest narrowest graduation*.

(b) If the index of an indicator extends over the entire length of a graduation, it shall be of uniform width throughout the portion that coincides with the graduation.

[*Nonretroactive as of January 1, 200X.]

The NCWM Specifications and Tolerances (S&T) Committee included this recommendation on its 1999 Agenda. At the 1999 Annual Meeting, the S&T Committee considered comments that paragraph S.1.5.3. is currently correct because a wider index design facilitates reading of the graduation. In contrast, when the index design is narrower than the narrowest graduation, reading the indication to the nearest graduation can be difficult. The S&T Committee acknowledged that the position favoring current paragraph S.1.5.3. is valid; however, the uncertainties associated with reading indices when the graduations are obscured cause other concerns.

The S&T Committee heard comments that many analog indicators are still being used; however, the proposal only applies to new devices. Measurement Canada re-stated that it believes the proposal is a more appropriate design requirement for indices than what is presently included in Handbook 44 . The NCWM S&T Committee also agreed that the proposal is more appropriate. Unless the S&T Committee receives more data to support the existing Handbook 44 language, the S&T Committee will return the proposal to voting status at the 2000 NCWM Interim Meeting.

Discussion: The Sector recognized that devices that meet the more stringent requirement in proposed paragraph S.1.5.3. also meet the current Handbook 44 requirements. If Handbook 44 is not modified, the NTEP Laboratories will continue to require the more stringent requirements for mutual recognition tests.

Conclusion: The Sector recommends that the NCWM S&T Committee collect more feedback about the proposed change to paragraph S.1.5.3. before the NCWM votes on this issue.

5. Test Method for Card-Activated Retail Motor Fuel Dispensers

Source: Gordon Johnson (Gilbarco, Incorporated)

Background: During an initial evaluation of a single hose dispenser used to meter propane, NTEP laboratory representatives noticed that Sections 17.2.4 and 17.2.5. of NCWM Publication 14 specified different requirements for single and multiple hose dispensers. Section 17 of the Checklist for Liquid-Measuring Devices outlined one set of requirements for single-hose dispensers (17.2.4) and a different set of requirements for multi-hose (17.2.5) dispensers. The NTEP laboratories met in May 1999 and agreed to recommend that the Sector remove paragraph 17.2.4 and require all dispensers comply with 17.2.5.

Discussion: The Sector agreed that the wording in paragraph 17.2.5. is appropriate for all types of dispensers. One NTEP laboratory pointed out that having the dispenser remain "authorized" for 15 seconds allows customers to change their minds about which grade of fuel to purchase. The Sector believes this is appropriate because it would take more than 15 seconds for the next customer to pull up to a dispenser and begin dispensing fuel.

Conclusion: The Sector agreed to modify Publication 14 by removing paragraph 17.2.4. and the wording "For multi-hose dispensers;" renumbering existing paragraphs 17.2.5. through 17.2.8.; and adding a new note to explain the term "handle" as follows.

~~17.2.4. Turn the dispenser "handle" on and use a card to authorize the dispenser.
Turn the handle off, then on. Try to deliver product; the dispenser must not dispense.~~

For multi-hose dispensers:

~~17.2.54. Turn the dispenser "handle" on and use a card to authorize the dispenser.
Turn the "handle" off. After a period of 15 seconds, turn the "handle" on.
Try to deliver product; the dispenser must not dispense.~~

Note: The term "handle" generically refers to the handle, flapper, button, on/off switch, or other mechanism used to activate or deactivate the dispenser.

6. Sealable Parameters for Retail Motor-Fuel Dispenser Systems

Source: California Division of Measurement Standards

Background: A field inspector contacted the California Division of Measurement Standards (DMS) after discovering a retail motor-fuel dispenser (RMFD) with the capability to adjust RMFD blend ratio settings through a remote console. In reviewing the system, the DMS determined that the fixed blend valves in the dispenser were replaced with adjustable electronic blend valves. Information from the manufacturer indicated that the dispenser had an event counter for the

blend ratio; however, the Certificates of Conformance for that dispenser and console did not cover an audit trail as the means for sealing electronic blend valves.

During the 1999 meeting of the NTEP Laboratories, the laboratories agreed the Certificates of Conformance (CC) should state the category of the device under the sealing section.

Discussion: The manufacturers acknowledged there are problems with sealed parameters that were never type evaluated. The Sector agreed that it is important for the laboratories to have uniform interpretations about the amount of effort that is necessary to access the audit trail. Uniform guidelines ensure that laboratories approve devices that allow any weights and measures inspector to view the audit trail. Most of the Sector members agreed that, ideally, no more than two keystrokes should be required to view the audit trail, although many devices currently require more than two keystrokes.

Conclusion: By the 2000 NCWM Interim Meeting, the Gasoline Pump Manufacturer's Association and Meter Manufacturer's Association agreed to develop reasonable test criteria for evaluating the "ease of access" to an audit trail. The RMFD and console controller manufacturers will review their Certificates of Conformance to determine if the "Sealing" section adequately addresses the category of sealing and how to access and exit the audit trail for their devices. If necessary, the manufacturers will supply NTEP with additional information about the audit trail.

Certificates of Conformance will list the sealing feature and the category of sealing in the Standard Features and Options Section of the Certificate of Conformance. The NTEP Laboratories will also list the procedure for accessing and exiting the security for sealable parameters under the CC "Sealing" section.

7. Stationary Cryogenic Cylinder Filling

Source: California Division of Measurement Standards

Background: The California NTEP Laboratory reported problems with cryogenic products vaporizing during the type evaluation of a stationary cylinder-filling device. Filling smaller cylinders with a dry hose resulted in significant errors, thus making the dry hose configuration unsuitable for this application. California asked the Sector to determine if it is appropriate to ask the NCWM to consider amending Handbook 44 Cryogenic Liquid-Measuring Devices Code paragraphs S.3.2. Discharge Hose and/or UR.2.4. Drainage of Discharge Line to address operations designed for filling small portable containers. In addition, the California laboratory asked the Sector to consider if dry-hose deliveries should be prohibited for small volume deliveries. The NTEP Measuring Laboratories discussed this issue at their May 1999 meeting. California Division of Measurement Standards (DMS) agreed to provide information about possible applications where dry hose applications might be appropriate.

Discussion: Charlie Nelson (California NTEP Laboratory/DMS) and Jeff Kelly (Hoffer Flow Controls) explained the process for measuring cryogenic liquids to the Sector. They explained that keeping the product in a liquid state and preventing flashing of the product requires cooling the hose to the temperature of the product. This is generally accomplished by circulating product back through the supply tank in a jacketed coaxial supply line; however, some of the product evaporates during this process of cooling the supply line. The customer is not charged for the product that evaporates. At the end of the each delivery, some product is left in the line. The customer is charged for the product that remains in the hose because the overfill valve prevents additional product from entering the customer's tank. For safety reasons, product cannot remain in the hose for very long and generally is drained to the atmosphere through an open cock valve at the end of the hose.

Conclusion: The Sector agreed that this issue needs further development. Charlie Nelson and the cryogenic measuring device manufacturers agreed to develop requirements for cryogenic measuring devices that meter liquid into cylinders. After developing proposed changes for Handbook 44, the group will come back to the Sector before forwarding a proposal on behalf of the Sector to the NCWM Specifications and Tolerances Committee.

8. Discount Fueling Using a Point-of-Sale (POS) System

Source: California Division of Measurement Standards

Background: Gilbarco, Incorporated and Convenient Fuel Group developed a retail motor-fuel dispensing point-of sale (POS) system which gives discounts on gasoline and other purchases. The system operates by tracking purchases through POS systems, similar to discount plans given at supermarkets. By tracking trends in consumer purchases, the system can promote sales on selected items.

The NTEP Measuring Laboratories agreed that a dispenser must be capable of indicating and computing all sales prices when the unit prices are discounted. The NTEP laboratories also reviewed the definition of price contract sales.

Discussion: Several NTEP laboratories provided examples of problems they discovered when testing POS systems that calculate discount pricing based upon purchases. The laboratories pointed out that many of these POS systems exhibit rounding errors when the price per unit changes based upon the number of purchases. One laboratory explained how the rounding errors occur using an example of a weighing application where the price per pound of a weighed commodity is adjusted based upon the previous quantities purchased. If the POS system has to “back-calculate” the net weight of the product purchased based upon the unit price and total price of the item, the following formulas are typically used:

$$(\text{"back - calculated" net weight}) = \frac{(\text{total price @ original unit price})}{\text{original unit price}}$$

and then

$$\text{"back-calculated" net weight} * (\text{adjusted unit price}) = \text{total price @ adjusted unit price}$$

Calculating the total sale at the adjusted price in this manner sometimes results in a difference of several cents in the total prices than if the adjusted price is calculated by weighing the product on a scale and multiplying the weight times an adjusted unit price. This example could also apply to products sold by volume.

The Sector was also concerned that in some instances the adjusted price applies only to an exact quantity of product (e.g. 10 gallons of motor-fuel). The Sector questioned how the dispenser/console controller would display the unit price and calculate the total price, if the customer decided to purchase more product at the non-discounted price.

Conclusion: The Sector agreed that no action is currently required by the Sector. The Sector agreed that, regardless of the method used to calculate the discount, the calculations must be mathematically correct.

9. Permanence of Labeling on Retail Motor-Fuel Dispensers

Source: Gordon Johnson (Gilbarco, Incorporated)

Background: The NIST Office of Weights and Measures received an inquiry from Gordon Johnson about the specifications for the identification plate on a retail motor-fuel dispenser. Gordon requested an interpretation on the philosophy of "permanence" and how that philosophy relates to the location of the label. Gordon was concerned about the criteria in Publication 14 (scales vs. meters) and the requirement for the labeling information to remain with the device. He also questioned whether or not a label should last for 100 years when the life expectancy of the device is 12 years. Gordon indicated that there are numerous complaints from weights and measures officials who must chip ice away from the bottom of dispensers to read labels affixed to the most permanent part of the dispenser cabinet. Inspectors have found similar situations when the bottom of the dispenser is impossible to access, such as when several inches of concrete is inadvertently poured around the base of a dispenser.

Gilbarco was developing new labels for its next generation of devices. According to Gilbarco, Underwriters Laboratories Inc. had no problem with the new labels. The labels are laser printed on "tamper evident" plastic tags that include supplemental bar coding.

The NTEP laboratories felt that Handbook 44 should address the intent of permanence. The laboratories also agreed that tamper evident identification tags are appropriate.

Discussion: Sector members had several different interpretations of the permanence requirements for identification plates. Several manufacturers thought that they were required to manufacture their identification plate from metal although Publication 14 states the following:

"The information may be on a metal or plastic plate attached that is attached with pop rivets, adhesive, or other means, but removable bolts or screws are not permitted. A foil or vinyl badge may be used provided that it is able to survive wear and tear, remains legible, and is difficult to remove. The printing on a foil badge must be easily readable and not easily obliterated by rubbing with a relatively soft object (e.g., the wood of a pencil)."

The Sector agreed that the intent of the permanence requirement for identification badges is to allow the marking information to remain legible for a reasonable period of time and ensure that the information cannot easily be transferred to another device. Several state weights and measures representatives pointed out that they seldom find problems with identification badges being switched on devices.

Conclusion: The Sector agreed that tamper evident labels satisfy the permanence criteria specified by Handbook 44 paragraph G-S.1. The Sector also agreed that Publication 14 adequately defines the permanence requirements for marking information and, therefore, does not favor modifying the existing text in Publication 14.

10. Printed Receipts for Prepaid Retail Motor-Fuel Dispenser Deliveries

Source: Maryland NTEP Laboratory

Background: The Maryland NTEP Laboratory asked the Sector to determine if there are any conflicts in the various Publication 14 checklist criteria for printed receipts issued for prepaid retail motor fuel dispenser sales. The Maryland Laboratory questioned if additional information is required on receipts if the total value of the sale is less than the prepaid amount. Questions were asked about the type of receipt and specific transaction information that were required in the examples of prepaid transactions below.

Examples:

- (1) A customer pays \$20.00 for gas, dispenses \$20.00 of gas, and asks the attendant for a receipt.
- (2) A customer pays \$20.00 for gas, dispenses \$15.50 of gas, and asks the attendant for a receipt.

The NTEP Measuring Laboratories agreed that the same information that appears on a post-pay receipt, as required by Handbook 44 paragraph S.1.6.7. Recorded Representations, is appropriate for receipts issued in a prepay application. Paragraph S.1.6.7. requires the receipt to specify the total volume of the sale, the unit price, the total computed price, and the product identity by name, symbol, abbreviation or code number.

Discussion: Several manufacturers were concerned that their existing equipment is not designed to provide the same information for both prepay and postpay transactions. After reviewing paragraphs G-S.5.1. Indicating and Recording Elements; General and S.1.6.7. Recorded Representations, the Sector agreed that it is appropriate to change Publication 14 to reflect the intent of paragraph S.1.6.7.

Conclusion: The Sector voted 16 in favor, 1 opposed, and 1 abstention for modifying paragraph one of Section 3. Recorded Representations, Point-of-Sale System of the ECRs/Retail Motor-Fuel Dispensers checklist as follows:

3. Recorded Representations, ~~Point-of-Sale Systems~~

A sales receipt showing the quantity, unit price, total price, and product identity for each fuel delivery in a transaction is required for point-of-sale systems. A printed receipt must be always available to the customer upon request, ~~but is not required for a prepaid transaction completed to the prescribed amount.~~

11. Number of Tests of Meters Used in Retail Motor-Fuel Dispensers

Source: Maryland NTEP Laboratory

Background: Will Wothlie (Maryland) asked the Sector to consider revising the initial examination criteria for meters used in retail motor-fuel dispensers. Paragraph two of Section A in the Field Evaluation and Permanence Test Procedures for Meters on page 10-87 of the May 1998 edition of Publication 14 required two meters to undergo at least two tests at the fast flow rate and two tests at the slow flow rate. Will Wothlie indicated that at a minimum, a test at a mid-flow rate should also be evaluated.

The NTEP Laboratories discussed this item at the May 1999 meeting and agreed that testing at a mid-flow rate is appropriate. The labs also felt that the type of test specified for the fast and slow flow rates should be more consistent with other meter types and concluded that, at a minimum, the NTEP laboratory should conduct five normal, two mid-range, and five slow flow rate tests.

Discussion: Some of the manufacturers felt that retail motor-fuel dispenser meters should undergo the same amount of testing as other types of meters. After discussing the difference for testing performed on different types of meters, the Sector voted in favor of expanding the number of tests required for retail motor-fuel dispensers. While discussing this issue, the Sector noted that none of the laboratories use the statistical test procedures for newly designed meters referenced in Section C of the Field Evaluation and Permanence Test Procedures for Meters on page 10-88. Consequently, the Sector agreed to remove this paragraph from the checklist.

Conclusion: The Sector agreed with the NTEP Laboratories' recommendation to modify the number of tests for newly designed meters in retail motor-fuel dispensers in the Field Evaluation and Permanence Test for Meters as follows:

Initial Examination

At least one meter will be chosen for throughput testing on each of two major products (e.g., unleaded gasoline and diesel fuel). At least ~~two~~ five tests at both the fast and slow flow rates and two midrange flow rate tests will be run on each of these two meters. Only one test at each flow rate needs be run on any remaining meters. If both products are not available for the type evaluation, the test may be performed using one product and a Provisional Certificate of Conformance may be issued for the one product. The test using the other product may be performed later to result in a full Certificate of Conformance.

Subsequent Examination

3. ~~Two~~Five tests at both fast and slow flow rates, and two midrange flow rate tests will be made on the throughput meters. Only one test at each flow rate need be run on any remaining meters.

The Sector also agreed to delete Paragraph C Draft for Study – Permanence Test of Retail Motor-Fuel Dispensers Using New Design Meters on page 10-88 of the checklist.

The above changes will appear in the next edition of Publication 14.

12. Considerations When Testing Liquefied Petroleum Gas (LPG) Meters

Source: Maryland NTEP Laboratory

Background: Will Wotthlie (Maryland) asked the Sector to review existing Publication 14 LPG test criteria to determine whether or not the laboratories should consider pressure and temperature, when they perform the repeatability test on an LPG meter. Publication 14 checklist repeatability test criteria only specify maintaining the approximate same flow rate.

When the NTEP Measuring Laboratories discussed this item at the May 1999 meeting, they pointed out that minor changes in the flow rate significantly affect the results of the repeatability test.

Discussion: The Sector discussed the influence that pressure and temperature have on the repeatability of test results on meters used to measure LPG. The Sector acknowledged that during the repeatability test factors such as temperature and pressure may significantly change. Ross Andersen (New York NTEP Laboratory) commented that a beach umbrella shields test equipment and product from the temperature effects of the sun. Representatives from Measurement Canada noted that they have incorporated guidelines for variances in their test procedures.

Conclusion: The Sector agreed to add a note to Publication 14 paragraph I, Repeatability on LPG to NH₃ Meters on page 10-89, to alert the laboratories that variances in temperature and pressure affect repeatability test results on LPG meter as follows:

I. Repeatability on LPG to NH₃ Meters:

When multiple tests are conducted at approximately the same flow rate, the range of the test results for the flow rate shall not exceed 40 percent of the absolute value of the maintenance tolerance and the results of each test shall be within acceptance tolerance. This tolerance does not apply to the test of the automatic temperature compensating system.

Note: Stable temperature and pressure indications are necessary during the entire repeatability test to achieve good test results

The NTEP laboratories agreed to review the guideline for and compare it with Canada's test procedures and develop recommendations for the next Sector meeting.

13. Software-Based Console Controllers

Source: Maryland NTEP Laboratory

Background: Will Wotthlie (Maryland) asked the Sector to interpret the Software Working Group's policy decision on evaluating software-based console controllers (that is, consoles consisting of software installed on generic computer hardware). In 1998, the Measuring Sector also discussed this issue in Albuquerque, New Mexico. The Gasoline Pump Manufacturer Association (GPMA) also developed a position letter indicating that GPMA would not pursue bringing an end to type evaluation of software-based consoles.

Discussion: The Sector acknowledged that NTEP has not evaluated a large number of software-based console controllers. Many weights and measures inspectors have difficulties testing consoles because the software identification information is not always readily available. Some jurisdictions proceed cautiously because of concerns over inadvertently shutting down the entire system or unfamiliarity with computer systems. Several jurisdictions have enacted policies prohibiting inspectors from searching through what may be several program levels to locate software identification and version information.

The NTEP Laboratories indicated that software-based console controllers should have easy access and readily display software information. Steve Malone (Nebraska) pointed out that many times it is easy to determine if the system does not meet the Handbook 44 specifications by looking at the receipt generated by the system. Canadian representatives told the

Sector that Canada stopped evaluating console controllers about 10 years ago because Canada viewed this component as performing only basic calculations. However, the increase in the number of software-based systems may prompt Canada to begin testing of console controllers again. Several manufacturers emphasized that many console controllers perform very few metrological functions such as stacked sales and communicate configuration information to the dispensers. One NTEP Laboratory noted that consoles capable of stacking sales and remotely configuring dispensers warrant an evaluation.

Conclusion: The Sector agreed that NTEP will continue to type evaluate console controllers.

14. Testing of Single Compartment vs. Split Compartment Vehicle Tank Meters

Source: Maryland NTEP Laboratory

Background: Will Wothlie (Maryland) asked the Sector to review if there are applications where it is appropriate to eliminate the split-compartment test (sometimes referred to as product depletion test) for vehicle tank meters. Will questioned whether or not vehicle mounted mass flow meters must go through a split-compartment test if the manufacturer intends that the meter be used on vehicles with a single compartment.

Discussion: The Sector agreed that *all* vehicle-mounted meters should pass a split-compartment, because even a single compartment can run dry and introduce air into the supply lines. One Coriolis mass flow meter manufacturer stated that Coriolis mass flow meters, unlike other device technologies, can track the density of the product in the meter. If the system is correctly configured, when air enters the meter the mass flow meter transmitter will recognize the density drop and send a signal to stop pumping and registering product.

Conclusion: The Sector agreed that before vehicle mounted applications are listed on an NTEP Certificate of Conformance, the meter must pass a split compartment test. The Sector agreed that specific procedures are needed; the NTEP labs will develop specific procedures. In the meantime, testing will be conducted using the same ad hoc procedures as used in past evaluations. The Sector agreed that this policy will apply to all meter technologies (e.g. Coriolis mass flow meters, turbine meters, positive displacement meters) even if the meter will never be installed on trucks with more than a single compartment. The permanence test still applies to include the throughput and with a duration of at least 20 days. The Sector agreed that, ideally, this test will be performed with a multiple-compartment vehicle; however, a single compartment vehicle may be used to simulate the split-compartment test by running the tank empty, if a multiple-compartment vehicle is unavailable.

15. Adding Ethane to the Mass Flow Meter Family of Products Table

Source: Andre Noel (Schlumberger Resource Management Services)

Background: Schlumberger received a customer inquiry about the approval for metering ethane through a Schlumberger mass flow meter. Ethane is a compressed liquid with a specific gravity of 0.3. Schlumberger noted that ethane falls outside the parameters in the new Mass Flow Product Group Table since the lowest specific gravity covered by the table in the compressed liquid group is 0.5. The Table was designed to reflect all of the products that could be used with mass flow meter technology. Unfortunately, the Sector did not consider ethane when it developed the table in 1998. Schlumberger believes that ethane represents the compressed liquid with the lowest specific gravity which would justify modifying the table. The Sector was asked to consider Schlumberger's proposal to modify the table:

Direct Mass Flow Product Group Table			
Product Groups	Typical Products	Specific Gravity	Minimum Test Requirements to Cover Entire Subgroup*
Normal Liquids	Water, Alcohols, Glycols, Water Mixes thereof, Agricultural Liquids, Fertilizers, Chemicals, Petroleum Solvents, Herbicides, and Suspensions	0.7 to 2.5	Test with one liquid having a specific gravity of 0.7 Test with one liquid having a specific gravity of 2.5
Compressed Liquids	Propane, Butane, <u>Ethane</u> , Freon 11, Freon 12, Freon 22, NH ₃ , etc.	<u>0.3</u> 0.5 to 0.68	Test with one product having a specific gravity at any point within the range <u>0.3</u> 0.5 to 0.68
Compressed Gases	CNG	0.6 to 0.8	Test with one product having a specific gravity at any point within the range 0.6 to 0.8
Cryogenic Liquids (BP 152 °C) and Liquid Natural Gas	Liquefied Oxygen, Nitrogen, etc.	0.07 to 1.4	Test with one liquid having a specific gravity at any point within the range 0.07 to 1.4.
Heated Products (above 50 °C)**	Bunker C, Asphalt, etc.	0.8 to 71.2	Test with one liquid having a specific gravity of 0.8 Test with one liquid having a specific gravity of 1.2

Discussion: Andre Noel explained that the physical properties of ethane are very similar to propane. One manufacturer pointed out that while the properties are similar, ethane represents a lower density product which is less likely to pass an NTEP evaluation. Canada commented that they would not expand a product group to include ethane without testing the performance of devices metering ethane.

Conclusion: The Sector voted 12 in favor, 3 opposed, and 1 abstention to adding ethane to the family of products table for mass flow meters and positive displacement meter. The changes to the family of products table are shown above for mass flow meters and below for positive displacement meters.

C. Product Families for Positive Displacement Meters and Mass Flow Meters

Product Family	Product Subgroup	Typical Products	Viscosity (SSU ¹)	Specific Gravity ²	% Abrasive Solids
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.
.
Compressed Gases, Liquefied	LPG ³	Propane, Butane, Ethane, Freon 11, Freon 12, Freon 22, etc.	0.5 to 3 SSU 0.1 to 0.5 centipoise	0.53 to 0.65	None
	NH ₃ ³	Anhydrous Ammonia	0.5 SSU 0.1 centipoise	0.56 to 0.68	None
.
.
.
<p>...</p> <p>²The specific gravity of each product family is determined as the ratio of the product mass (@ 15.6 °C (60 °F) petroleum products and 20 °C (68 °F) all other products) to the mass of an equal volume of distilled water at 4 °C (39 °F).</p>					

16. Multi-Product Testing of Mass Flow Meters

Source: Andre Noel (Schlumberger Resource Management Services)

Background: During the 1998 NTETC Measuring Sector meeting in Albuquerque, NM, the Sector developed the Direct Mass Flow Product Group Table. The Sector also developed test criteria for meters that measure several products with different specific gravities without any change to the meter calibration. The intent of this test was to verify the claim that a meter is capable of measuring multiple products over a restricted range of specific gravities without recalibrating the meter, thereby covering a device for a multi-product application.

After the 1998 meeting, several Sector members developed different interpretations of the test criteria for multi-product testing. Schlumberger's interpretation is that after passing the multi-product test, the manufacturer can use its approved metering devices in multi-product applications regardless of the specific gravity range the device originally demonstrated it could cover.

The rationale for the NTEP multi-product test is to verify that the mass flow meter meets the basic fundamental test criteria for products that are listed on the manufacturer's Certificate of Conformance. Namely, that a mass flow meter can meter multiple products regardless of where they fall within the stated specific gravity range without any adjustment to the meter calibration or zero. Prior to sealing the device in a multi-product field application, the local weights and measures inspector conducts accuracy tests on the products that represent the extremes of the specific gravity range.

Measurement Canada conducts multi-product approval tests on all mass flow meters with two products representing a specific gravity range of approximately 0.3. Canada requires empirical data to support expanding the application to products which fall outside of the 0.3 range or band. For example, consider a device which is approved for multi-products with a specific gravity range of 0.7 to 1.0. Before the original equipment manufacturer (OEM) can cover products outside that 0.3 range, such as products with 0.6 or 1.1 specific gravity, data must be provided on those new applications.

Discussion: The Sector reviewed the following technical policy covering the multi-product test, which was based on decisions made at its 1998 meeting:

S. Product Families for Mass Flow Meters

Multi-product applications (that is, applications in which the meter will be used without a change to zero or calibration to dispense different products which vary in specific gravity by more than 0.1) must include a multi-product test. The multi-product test will be performed on the meter without a change to zero or calibration using multiple products having a difference in specific gravity of at least 0.2. For devices which will be used to dispense multiple products having a specific gravity range greater than 0.2, the multi-product testing must be performed over the anticipated range before multi-product applications will be included on the CC. For the multi-product testing, throughput testing will be performed on one or a combination of the products; testing for the subsequent test will be conducted on both products. Multi-product testing requirements do not apply to meters used to dispense a product such as propane in which the density varies in normal operation.

The Sector agreed that the wording is correct.

Conclusion: The Sector confirmed its 1998 decision. A multi-product test is conducted to demonstrate that a meter can accurately measure multiple products over a specified range of specific gravities without changing zero or calibration. The specific range of specific gravities tested and covered without changing the calibration for multiple product applications and the testing required are addressed in the policy shown above. The Sector recognized that the U.S. policy for multi-product testing differs from Canada's policy. The U.S. allows multi-products covered to move across the range of specific gravities already approved in the product family.

17. Compatibility of Electronic Components

Source: Andre Noel (Schlumberger Resource Management Services)

Background: Andre Noel asked the Sector to determine if it is appropriate for NTEP to cover the interface of approved components, where the compatibility of those components is later verified during the initial verification test by a weights and measures field official.

It appears NTEP tests are not administered equally across the different technologies. For example, NTEP evaluations for mechanical and electronic registers used in vehicle tank meter and bulk terminal applications have not been subjected to the same evaluation as comparable systems in mass flow meter applications. One NTEP Laboratory representative noted instances where electronics approved for a petroleum product applications were interfaced with devices used to dispense liquefied petroleum gas or cryogenic products the system no longer met Handbook 44 and Publication 14 requirements.

Schlumberger noted that liquid-measuring device manufacturers have made significant investments in testing equipment to attain NTEP approval. The device manufacturer also incurs extra costs to ensure that equipment is compatible with other NTEP approved devices operating at custody transfer sites in the marketplace. Schlumberger stated that it understands customer and industry requirements when its electronic equipment is interfaced with associated equipment. Schlumberger wants to provide its customers with the option to select the equipment that best suits their needs. Schlumberger views this approach as no different than the industry practice of interfacing equipment via pulse or serial communications.

Schlumberger reiterated that approved devices should not undergo a separate NTEP evaluation to determine compatibility with other devices. Schlumberger believes that requiring a device to complete an additional 30-day permanence test where it must remain within acceptance tolerance is unreasonable because those electronic components already have NTEP CCs. Schlumberger verifies equipment compatibility prior to a sale or the State or local jurisdictions approving the installation. Schlumberger does not ask its customers to pursue state or local jurisdiction approval of a site application without guaranteeing the devices are compatible. Therefore, Schlumberger recommends testing for compatibility should only be conducted during field level evaluations.

Measurement Canada adheres to a policy of allowing the original equipment manufacturer to create a new system pending a compatibility evaluation by the field official at the installation site. Canada instituted this practice, in part, to alleviate some of the administrative procedure. Canada noted that their compatibility evaluation has many conditional requirements.

Discussion: Several retail motor-fuel dispenser manufacturers cited examples of tests that they performed to approve the combination of separate components that were previously individually tested by NTEP. This prompted the Sector to discuss what the phrase "may be interfaced with approved and compatible equipment" means on an NTEP certificate. Several Sector members noted that most weighing and measuring devices are interfaced with an indicator that represents an equivalent type used during type evaluation. Mass flow meters type evaluated as stand-alone systems are not tested in combination with a separate indicating element because mass flow meter transmitters are generally capable of indicating all of the required metrological information.

Conclusion: The Sector voted 2 in favor, 14 opposed, and 1 abstention for compatibility test of NTEP equipment during the initial field evaluation of a system. The Sector agreed similar devices that were individually tested for a similar application can be "mixed and matched" without additional testing, if the system functions properly during the initial routine field test. For example, inspectors can determine the compatibility of an approved console interfaced with an approved retail motor-fuel dispenser during a field evaluation when both components are previously approved in like applications. If devices are to be used in dissimilar applications, then additional NTEP testing is required.

18. Recorded Representation of Count Items on ECR Systems

Source: Maryland NTEP Laboratory

Background: Will Wothlie (Maryland) reported finding ECR receipts with items by count expressed in a decimal format with as many as three digits to the right of the decimal point. At the May 1999 NTEP laboratory meeting, several NTEP Laboratories reported finding similar problems with receipts. Publication 14, ECRs/Retail Motor Fuel Dispensers Checklist paragraph 3.7 Recording Representations page 9-11 states that decimal expressions of count are acceptable provided that "fractions of a whole unit can not be expressed." It was not clear to the laboratories why it is necessary for any device to print trailing zeros after the decimal point for items sold by count.

Discussion: The Sector considered deleting the following text from paragraph 3.7 of the ECRs/Retail Motor-Fuel Dispensers checklist as follows:

~~3.7. The quantity representation of an item sold by count must be expressed in whole units.—An expression of count with a decimal point and trailing zeros, (e.g., 2.00 items) is acceptable provided that fractions of a whole unit can not be expressed.~~

Weights and measures representatives noted several instances where they found devices that violated the existing paragraph 3.7. Industry representatives were not certain of the ramifications of prohibiting trailing zeros for items sold by count.

Conclusion: The Sector agreed that it may be unnecessary to display the trailing zeros on a receipt for items that are sold by count. However, several manufacturers wanted to consult with their software division to determine the ramifications of prohibiting the trailing zeros. The NTETC Weighing Sector is also asked to discuss this issue. Both Sectors will be balloted the first week of November 1999 to determine if prohibiting the expression of items by count with a decimal point and trailing zeros is acceptable. The ballot will list the proposal to change paragraph 3.7. shown above.

19. Location of ID Information Required by G-S.1. Identification

Source: Ohio NTEP Laboratory

Background: Jim Truex (Ohio) received an inquiry from another NTEP Lab about the location of marking information required by paragraph G-S.1. Identification on a point-of-sale system previously evaluated by the Ohio lab. During field evaluation of the same model officials complained that the required markings are located behind a door. The Certificate of Conformance (CC) for the device explains where the markings are located; however, field officials contend that, without knowing the model designation from the ID plate, they do not know which CC to try to locate. At the time of the evaluation, the Ohio Lab determined that the markings met the requirements of Handbook 44 and Pub 14, NIST-OWM concurred with Ohio's interpretation of G-S.1. The NCWM S&T Committee reviewed paragraph G-S.1. in 1985 because of similar questions relating to the location of required markings on weighing elements installed in check-out stands. The Committee determined that required markings could be located under a scale platter or behind a door if no tool was required to access the markings. The Sector was asked to review paragraphs G-S.1. and G-UR.2.1.1. Visibility of Identification to determine if NTEP's previous interpretation of the requirement is correct.

Discussion: The Sector supported Ohio's interpretation that it is acceptable to place marking information behind a door or under a cover. The Sector reviewed the marking requirement sections of the LMD Checklist and ECRs/Retail Motor-Fuel Dispensers Checklist and found that the ECRs checklist prohibits placing the marking information under a cover or behind a door.

Conclusion: The Sector agreed to delete the word "not" from the note in section 1. Identification of the ECRs/Retail Motor-Fuel Dispensers Checklist on page 9-8 of Publication 14 to make the marking requirement consistent in both checklists as follows:

1. Identification

Note: *A location under a cover or inside a panel door is not acceptable. Visibility may be achieved by placing a duplicate serial number badge on the front, side, or top of the ECR. This badge may contain only the serial number if the other information is visible elsewhere on the ECR.*

The above changes will appear in the next edition of Publication 14.

The Technical Advisors will review Publication 14 to determine if other paragraphs need to be modified to make marking information criteria consistent and agree with Handbook 44.

20. Temperature Compensation of Vehicle-Tank Meters

Source: Oregon/California Weights and Measures

Background: Several weights and measures jurisdictions have found vehicle-tank meters installed with a temperature compensation feature. Handbook 44 and Publication 14 do not address how to test vehicle-tank meters that are equipped with temperature compensation nor does either document include specifications or tolerances for these components. NTEP has issued several Certificates of Conformance (CC) for vehicle-tank meters that appear to cover systems with temperature compensation. This confusion occurred because this equipment may be used in various applications and the CC text describing the temperature compensation feature does not distinguish which application is covered for the temperature compensation feature. Additional text may also be necessary on the CCs to clarify which applications were type evaluated in the uncompensated mode.

The Oregon Department of Agriculture asked the Sector if it is appropriate to equip vehicle-tank meters to operate with a temperature compensation feature and, if so, how to test temperature-compensated vehicle-tank meters

Discussion: The Sector recalled that the NCWM Specifications and Tolerances Committee addressed this issue several times in the past. However, improvements in electronic automatic temperature compensating equipment make automatic

temperature compensation (ATC) installation easier, less costly, and the new net/gross equipment does not require deactivation during test since both gross and net indications can be viewed.

Canada advised the Sector that the ATC program is voluntary in Canada. The Canadian House of Commons is currently reconsidering its support of ATC, based on the political climate. Several Sector members felt that as weights and measures jurisdictions decide to permit ATC, it is only equitable if ATC is required on all vehicle-tank meters year round or not at all. The Sector agreed that both the inspectors and consumers would benefit from an educational program on temperature compensating systems. Tina Butcher (NIST) noted that the Office of Weights and Measures concerns that education must be provided to both consumers and businesses, to cover issues such as value comparison and the importance of compensation on a year-round basis. OWM believes further work must be done to modify Handbooks 44 and 130 to address the new method of sale and to add specifications, tolerances, and test procedures to address the equipment.

Conclusion: The Sector agreed that ATC is the most equitable method to meter products. The Sector recognized the need for specifications, tolerances, and test procedures. However, if the NCWM Specifications and Tolerances Committee decides to address this issue, it should consider the challenges that Canada encountered since 1972 when it established a voluntary ATC program.

21. Meeting Location for 2000 NTETC Measuring Sector Meeting

Background: Prior to 1997, the Measuring Sector met in conjunction with the Southern Weights and Measures Association (SWMA). In 1997, the Measuring Sector was invited to meet in conjunction with the Western Weights and Measures Association (WWMA) Annual Meeting. The Sector agreed that moving the meeting would allow the western states that recently adopted NTEP requirements to participate in the NTEP process. At 1997 and 1998 meetings, the Sector decided to hold its upcoming meetings with the WWMA again. During the 1999 NCWM Annual Meeting members of the Southern Weights and Measures Association (SWMA) met in the regional meeting session and adopted a motion to request the Measuring Sector meet in conjunction with the SWMA in 2000.

Discussion: The Technical Advisor provided the Sector with information about the tentative 2000 meeting sites. The WWMA meeting will be held in San Francisco, California, and the SWMA takes place in Austin, Texas. The primary difference between the locations is hotel costs; lodging costs in Austin, Texas are \$95 per night, and in San Francisco are \$147 per night.

The Sector noted that the accessibility to the meeting site and length of the meeting are important considerations. A Sector member proposed that the Measuring Sector consider meeting in conjunction with the Weighing Sector, because many of the issues appear on both agendas. The Sector did not support the option of a joint sector meeting.

Conclusion: The Sector voted 10 in favor, 3 opposed, and 1 abstention to hold the 2000 NTETC Measuring Sector meeting in conjunction with the SWMA Annual Meeting in Austin, Texas.

22. New Agenda Discussions - The Next Edition of Publication 14

Discussion: Several Sector members expressed concern about the delay in publishing the 1999 edition of Publication 14. One Sector member noted the laboratories have no working document. Tina Butcher (NIST), NTEP Manager, advised the group the Sector Meeting Summaries were distributed to all members and are a written reference for the latest changes to Publication 14. Laboratory representatives also participate in Sector meetings and are apprised of Sector decisions at those meetings.

Mrs. Butcher explained the technical sections were on schedule; however, the NTEP reorganization discussions resulted in delays in updates to other portions of the document. In July, the NCWM agreed the technical sections could be published; however, that decision coincided closely with the NCWM Annual Meeting and several other publication deadlines. Since several Sector meetings were planned shortly after the NCWM Annual Meeting, NIST-OWM suggested a new target date of 2000; this would permit sufficient time to include all of the Sectors' 1999 decisions in the latest edition of Publication 14.

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